

1/35  
SEQUENCE LISTING

5                   <110> Biotica Technology Limited  
                  Pfizer Inc  
                  Gaisser, Sabine

10                  <120> Polyketides and their synthesis

15                  <130> IP0013-WO01  
                  <150> GB0327721.7  
                  <151> 2003-11-28

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                  <170> PatentIn version 3.2

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25 Arg Gly Phe Ala Trp Leu Asp Met Gly Thr His Asp Ser Leu Leu Gln  
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40 Gln Cys Tyr Arg Leu Gly Gln Glu Leu Arg Ser Ser Ser Tyr Gly Ser  
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25 Thr Gly Thr Val Ala Arg Leu Asp Gly Cys Glu Leu Phe Gly Tyr Pro  
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30 Val Lys Asp Ala His Arg Tyr Gly Val Gly Glu Ile Asp Ser Gly Gly  
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35 Arg Leu Leu Ser Leu Glu Glu Lys Pro Arg Arg Pro Leu Glu Pro Gly  
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40 Arg His Arg Leu Tyr Leu Tyr Thr Asn Asp Val Val Glu Ile Ala Arg  
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45 Thr Ile Ser Pro Ser Ala Arg Gly Glu Leu Glu Ile Thr Asp Val Asn  
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50 Lys Val Tyr Leu Glu Gln Gly Arg Ala Ala His Gly Ala Gly Ala Val  
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55 Val Ala Trp Leu Asp Met Gly Thr His Asp Ser Leu Leu Gln Ala Gly  
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60 Gln Tyr Val Gln Leu Leu Glu Gln Arg Gln Gly Glu Arg Ile Ala Cys  
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65 Ile Glu Glu Ile Ala Met Arg Met Gly Phe Ile Ser Ala Glu Gln Cys  
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35 Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Glu Ser Ser  
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40 Glu Ala Phe Val Arg Thr Asn Val Glu Gly Thr Arg Val Leu Leu Gln  
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45 Glu Val Tyr Gly Ser Ile Ala Glu Gly Ser Trp Pro Glu Asp His Pro  
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50 Leu Ala Pro Asn Ser Pro Tyr Ala Ala Thr Lys Ala Ala Ser Asp Leu  
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55 Leu Ala Leu Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Val Thr  
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60 Arg Cys Ser Asn Asn Tyr Gly Pro Arg Gln Tyr Pro Glu Lys Ala Val  
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60 Pro Leu Phe Thr Thr Asn Leu Leu Asp Gly Leu Pro Val Pro Leu Tyr  
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Asp Arg Pro Gly His Asp Arg Arg Tyr Ser Val Asp Thr Thr Lys Ile  
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Glu His Val Ala Gly His Pro Asp Leu Glu Phe Val Arg Gly Asp Ile  
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70

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5 Glu Ala Phe Val Arg Thr Asn Val Glu Gly Thr Arg Val Leu Leu Gln  
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25 Leu Ala Leu Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Val Thr  
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30 Arg Cys Ser Asn Asn Tyr Gly Pro Arg Gln Tyr Pro Glu Lys Ala Val  
180 185 190

35 Pro Leu Phe Thr Thr Asn Leu Leu Asp Gly Leu Pro Val Pro Leu Tyr  
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Gly Asp Gly Gly Asn Thr Arg Glu Trp Leu His Val Asp Asp His Cys  
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40 Arg Gly Val Ala Leu Val Gly Ala Gly Gly Arg Pro Gly Val Ile Tyr  
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45 Asn Ile Gly Gly Thr Glu Leu Thr Asn Ala Glu Leu Thr Asp Arg  
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50 Ile Leu Glu Leu Cys Gly Ala Asp Arg Ser Ala Leu Arg Arg Val Ala  
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55 Asp Arg Pro Gly His Asp Arg Arg Tyr Ser Val Asp Thr Thr Lys Ile  
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	ctgaccgcgc	tccccgtgg	cgacgacacg	gccatcgctcg	agctgatcac	cgagatcgcc	1560
	gacgacccctcg	tcctctacca	cgaggcatg	gacttcgtgg	acacccgcga	cgagccgcgt	1620
	tcctggaaac	acgcgcctcg	acagcagacg	atcatgtcg	ccatgtgc	ctcgccgcgt	1680
	aacggcgaca	gcaccatcga	cgacatggtg	gcgcgtggccc	gttcctggaa	accggacccctc	1740
	gtcctgtggg	agcccttcac	ctacgcggga	cccgccgcgc	cgacgcgcctg	cgccgcgcgc	1800

12/35

5	cacgccccggc tgctgtgggg tcccgaacgtg gtcctaaca cacggcggca gttcacccgg	1860
	ctgctcgccg agcgccccgt cgaacagcgc gaggacccgg tcggcgaatg gctcacgtgg	1920
10	acgctggagc gccacggcct cgccgcccac gcggacacga tcgaggaact gttcgccggg	1980
	cagtgacga tcgacccca gccccggagc ctgcggctgc cggtcgacgg cgaggtcgtg	2040
	cccatgcgct tcgtgcccgt aacggcgcc tcggtcgtcc cccgcctggct ctccgagccg	2100
	cctgccccggc cccgggtctg cgtcaccctc ggcgtctcca cccgggagac ctacggcacg	2160
	gacggcgtcc cgttccacga actgctggcc ggactggccg acgtggacgc cgagatcgtc	2220
15	gccaccctcg acgcggggca gctccggac gccggcggtc tgcccgcaa tgtgcgcgtc	2280
	gtcgacttcg tgccgctgga cgcctgctg ccgagctgcg ccgcgatcgt ccaccacgg	2340
20	ggcgcgggaa cctgtttcac ggccaccgtg cacggcgtcc cgcaagatcgt cgtggcctcc	2400
	ctctggacg cgcgcgtgaa gggcacccaa ctcggcgagg cgggcgcgg gatgcgcctg	2460
	gaccccgggg aactggcgt ggacaccctg cgcggcgccg tcgtgcgggt gctggagagc	2520
25	cgcagatgg cctgtggcgcc gctcgccctc gccgacgaga tgctcgccgc ccccaccccg	2580
	gccgcgcctcg tcccccgct cgaacgcctc accggcgcc accggcgccg ctgatcccg	2640
30	caaggagccc ccatgaacct cgaatacagc ggcgacatcg cccgggttgcgacatcg	2700
	caccaggaa agggcaagga ctaccggcg gaggccgagg agctggccgc gcttgtcacc	2760
	cagcgcgcgc ccccccccg ctccctccctc gacgtggcct gcggaaacggg gatgcacctg	2820
35	cggcacctcg gcgacctttt cgaggaggtg gccgggggtgg agatgtcccc cgacatcg	2880
	gccatcgccg acggcgccaa cccggaggcc ggcattccacc ggggggacat gcgggacttc	2940
40	gccctcgccg cccgcttcga cgcgtgatc tgcatgttca gttccatcg gcacatcg	3000
	gaccagcgccg aactggacgc ggcgatcgcc cggttcgcgc cgacatcgcc gtcggcgccg	3060
	gtcgtgatcg tcgatccctg gtgggtcccg gagacgttca caccgggttgcgacatcg	3120
45	agcctcgctcg aggccgaggg cgcacccatc gcgacccatc cccactccgc gctcgaggac	3180
	ggcgccgaccc ggatcgatgt ggactaccc gtcggcgatc cggggggaggg ggtgcggc	3240
50	ttgaaggaga cccatcgatc caccgttttc gggcgatcgac agtacgaggc ggccttcacc	3300
	gcggcgccggg tgcgtggcgttca gtaccccttgc caccgggttgcgacatcgcc	3360
	ggcgatcgatgt ggactaccc gtcggcgatc cggggggaggg ggtgcggc	3375
55	<210> 8	
	<211> 295	
	<212> PRT	
	<213> <i>Streptomyces eurythermus</i>	
60	<400> 8	

Met Lys Gly Ile Ile Leu Ala Gly Gly Ser Gly Thr Arg Leu Arg Pro  
1 5 10 15

5 Leu Thr Gly Ala Leu Ser Lys Gln Leu Leu Pro Val Tyr Asp Lys Pro  
20 25 30

10 Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Ala Gly Ile Arg Asp  
35 40 45

15 Ile Gln Ile Ile Thr Ser Lys Thr His Leu Glu Met Phe Arg Ser Leu  
50 55 60

20 Leu Gly Asp Gly Ser Arg Ile Gly Ile Ser Val Gly Tyr Ala Glu Gln  
65 70 75 80

Glu Glu Pro Arg Gly Ile Ala Glu Ala Phe Leu Ile Gly Glu Glu His  
85 90 95

25 Ile Gly Asp Asp Pro Val Ala Leu Ile Leu Gly Asp Asn Val Phe His  
100 105 110

30 Gly Pro Gly Phe Ser Ser Val Leu Ala Ser Thr Ala Ala Arg Leu Asp  
115 120 125

35 Gly Cys Glu Leu Phe Gly Tyr Pro Val Lys Asp Pro Arg Arg Tyr Gly  
130 135 140

40 Val Gly Glu Val Asp Ala Glu Gly Arg Leu Val Ser Leu Glu Glu Lys  
145 150 155 160

45 Pro Glu Lys Pro Arg Ser His Leu Ala Val Thr Gly Leu Tyr Phe Tyr  
165 170 175

Asp Asn Gly Val Val Asp Ile Ala Arg Arg Leu Thr Pro Ser Pro Arg  
180 185 190

50 Gly Glu Leu Glu Ile Thr Asp Val Asn Lys Val Tyr Leu Glu Gln Gly  
195 200 205

55 Arg Ala Arg Met Thr Glu Leu Gly Arg Gly Phe Ala Trp Leu Asp Met  
210 215 220

60 Gly Thr His Ser Ser Leu Leu Gln Ala Gly Gln Tyr Val Gln Leu Leu  
225 230 235 240

14/35

Glu Gln Arg Gln Gly Val Arg Ile Ser Cys Val Glu Glu Ile Ala Leu  
245 250 255

5 Arg Met Gly Tyr Ile Ser Ala Arg Gln Cys His Glu Leu Gly Arg Glu  
260 265 270

10 Leu Glu Ser Ser Ser Tyr Gly Arg Tyr Leu Met Asp Val Ala Glu Thr  
275 280 285

15 Leu Met Ser Gly Pro Ala Ala  
290 295

20 <210> 9  
<211> 332  
<212> PRT  
<213> Streptomyces eurythermus

<400> 9

25 Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe  
1 5 10 15

30 Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Leu Ala Gly Ala Arg  
20 25 30

35 Thr Val Val Val Asp Lys Leu Thr Tyr Ala Gly Asn Leu Ala Asn Leu  
35 40 45

40 Asp Pro Val Ala Asp His Pro Ser Leu Glu Phe Val His Ala Asp Ile  
50 55 60

45 Arg Asp Ala Glu Val Met Ser Arg Val Val Arg Gly Ala Asp Val Val  
65 70 75 80

50 Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Asp Ala  
85 90 95

55 Ser Ala Phe Val Glu Thr Asn Val Arg Gly Thr Gln Val Leu Leu Gln  
100 105 110

60 Ala Ala Val Glu Ala Gly Ala Gly Arg Phe Val His Val Ser Thr Asp  
115 120 125

65 Glu Val Tyr Gly Ser Ile Ala Glu Gly Ser Trp Arg Glu Glu Gln Pro  
130 135 140

70 Leu Ala Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Ala Ser Asp Leu  
145 150 155 160

Leu Ala Leu Ala Tyr His Arg Thr Tyr Gly Leu Pro Val Val Val Thr  
165 170 175

5

Arg Cys Ser Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Val Val  
180 185 190

10

Pro Leu Phe Ala Thr Asn Leu Leu Asp Gly Leu Thr Val Pro Leu Tyr  
195 200 205

15

Ser Asp Gly Gly Asn Ser Arg Asp Trp Leu His Val Asp Asp His Cys  
210 215 220

20

Arg Gly Ile Ser Leu Val Ala Thr Arg Gly Arg Pro Gly Glu Val Tyr  
225 230 235 240

25

His Ile Gly Gly Gly Thr Glu Leu Thr Asn Arg Glu Leu Thr Lys Arg  
245 250 255

Leu Leu Gly Leu Cys Gly Ala Asp Ala Ser Ser Val Arg His Val Ala  
260 265 270

30

Asp Arg Pro Gly His Asp Leu Arg Tyr Ala Leu Asp Ile Gly Lys Ile  
275 280 285

35

Thr Gly Glu Leu Gly Tyr Ala Pro Arg Thr Asp Phe Thr Thr Gly Leu  
290 295 300

40

Ala Asp Thr Val Arg Trp Tyr Ala Glu Asn Arg Ala Trp Trp Glu Pro  
305 310 315 320

45

Leu Lys Lys Ala Ala Gln Glu Ala Arg Arg Thr Asp  
325 330

50

<210> 10  
<211> 787  
<212> PRT  
<213> Streptomyces eurythermus

<400> 10

55

Val Ser Thr Pro Ser Ala Pro Pro Val Pro Gly Ala Pro Ser Pro Ala  
1 5 10 15

60

Gly His Pro Asp Glu Gly Leu Trp Val Arg Arg Tyr Arg Pro Val Arg  
20 25 30

16/35

Asp Pro Glu Leu Arg Leu Val Cys Phe Pro His Ala Gly Gly Ala Ala  
35 40 45

5 Thr Ser Phe Ala Ala Leu Ala Arg Gly Leu Asp Glu Thr Val Glu Ala  
50 55 60

10 Leu Ala Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg His Glu Pro Phe  
65 70 75 80

15 Ile Pro Ser Ile Ser Gly Leu Val Asp Gln Val Val Pro Glu Ile Leu  
85 90 95

Arg Trp Ala Asp Arg Pro Leu Ala Leu Phe Gly His Ser Met Gly Ala  
100 105 110

20 Thr Val Ala Phe Glu Val Ala Arg Arg Leu Arg Gly Ser Gly Gln Ala  
115 120 125

25 Ser Pro Val His Leu Leu Val Ser Gly Arg Arg Ala Pro Thr Val Arg  
130 135 140

30 Arg Arg Asp Val Ala His Leu Leu Asp Asp Asp Ala Leu Ile Ala Glu  
145 150 155 160

35 Ile Ala Thr Leu Gln Gly Thr Glu Asp Ala Val Leu Gln Asp Glu Glu  
165 170 175

Leu Leu Arg Leu Ala Leu Pro Ala Ile Arg Asn Asp Tyr Arg Ala Ala  
180 185 190

40 Gly Thr Tyr Ala Tyr Val Pro Gly Gly Ala Leu Asp Cys Pro Val Thr  
195 200 205

45 Val Leu Thr Gly Asp Arg Asp Pro Asp Val Pro Leu Glu Glu Ala Arg  
210 215 220

50 Ala Trp Arg Glu Leu Thr Thr Gly Pro Phe Ala Leu His Thr Phe Ala  
225 230 235 240

Gly Gly His Phe Tyr Leu Asn Asp Arg Met Asp Glu Val Cys Arg Thr  
245 250 255

55 Ile Gly Asp Ala Leu Ala Gly Thr Ala Thr Ala Asp Thr Ala Thr Gly  
260 265 270

Thr Val Pro Pro Arg Thr Ala Ala Asp Thr Ser Thr Gly Pro Val Pro

17/35

275

280

285

5 Pro Arg Thr Ala Ala Asp Thr Ala Arg Glu Pro Val Pro Pro Arg Ser  
290 295 300

10 Ala Pro Ala Pro His Gly Ala Ala Arg Arg Arg Ala Asp Ala Val Arg  
305 310 315 320

Pro Gly Asp Pro Val Asp Thr Ala Arg Arg Val Leu Val Ser Ala Arg  
325 330 335

15 Thr Ala Asp Ser Ala Val Thr Pro Phe Asp Gly Ile Ser Gly Trp Leu  
340 345 350

20 Ala Glu Arg Leu Arg Ala Gly Arg Phe Asp Val Ser Arg Val Pro Phe  
355 360 365

25 Ala Glu Leu Arg Gly Trp Ser Phe His Pro Gly Thr Gly Asn Leu His  
370 375 380

30 His Ala Ser Gly Arg Phe Phe Ser Val Glu Gly Leu His Val Arg Thr  
385 390 395 400

Asp Arg Leu Pro Glu Arg Gly Trp Thr Gln Pro Ile Ile Val Gln Pro  
405 410 415

35 Glu Val Gly Leu Leu Gly Ile Val Ala Arg Glu Ile Asp Gly Val Leu  
420 425 430

40 His Phe Leu Met Gln Ala Lys Met Glu Pro Gly Asn Val Asn Val Leu  
435 440 445

45 Gln Val Ser Pro Thr Val Gln Ala Thr Arg Ser Asn Phe Thr Gly Val  
450 455 460

50 His Arg Gly Arg Asp Ile Arg Tyr Leu Asp Leu Phe Met Gly Pro Arg  
465 470 475 480

Arg Ala Arg Val Leu Val Asp Ser Ile Gln Ser Glu Gln Ala Asp Trp  
485 490 495

55 Phe Leu Ala Lys Arg Asn Arg Asn Met Ile Val Glu Leu Ala Ala Asp  
500 505 510

60 Asp Asp Leu Asp Ile Gly Glu Asp Phe Arg Trp Leu Thr Leu Gly Gln  
515 520 525

Leu Arg Arg Leu Leu Met Leu Asp Asn Val Val Asn Met Asp Ala Arg  
530 535 540

5

Ser Ile Leu Ala Cys Leu Pro Thr Ala Asp Ala Asp Ala Ser Ala Pro  
545 550 555 560

10

Ser Pro Val Leu Arg Ser Phe Phe Gly Ser Pro Gly Ala Ala Arg His  
565 570 575

15

Thr Thr Ala Glu Val Leu Thr Trp Phe Thr Gly Val Arg Ala Leu Arg  
580 585 590

20

Glu Leu Val Gln Asn Arg Val Pro Leu Asp Thr Val Thr Ala Asp Gly  
595 600 605

25

Trp Tyr Arg Thr Pro His Glu Ile Ala His Glu Ser Gly Arg His Phe  
610 615 620

Arg Val Met Ala Ala Glu Val Ser Ala Ser Ser Arg Glu Val Thr Ser  
625 630 635 640

30

Trp Thr Gln Pro Leu Ile Glu Pro Arg Leu Pro Gly Leu Met Ala Leu  
645 650 655

35

Leu Val Lys Ser Val Asp Gly Val Leu His Ala Leu Val Arg Ala Arg  
660 665 670

40

Val Asp Val Gly His Leu Asn Val Ala Glu Leu Ala Pro Thr Val Gln  
675 680 685

Cys Arg Pro Gln Glu His Thr Gly Pro Arg Gly Leu Pro Gly Pro Pro  
690 695 700

45

Tyr Leu Glu Asp Val Leu Ser Ala Pro Pro Gln Asp Val Arg Tyr Asp  
705 710 715 720

50

Ala Val Gln Ser Glu Glu Gly Gly Arg Phe Phe His Ala Gln Asn Arg  
725 730 735

55

Tyr Val Ile Val Glu Val Pro His Asp Phe Pro Glu Asp Ala Pro Asp  
740 745 750

60

Asp Phe Ala Trp Leu Ser Leu Gly Gln Leu Thr Gly Leu Leu Ala His  
755 760 765

Gly Asn Tyr Leu Asn Ile Glu Leu Arg Thr Leu Val Ala Cys Ala His  
770 775 780

5

Thr Leu Tyr  
785

10

<210> 11  
<211> 333  
<212> PRT  
<213> Streptomyces eurythermus

15

<400> 11

Met Val Asn Asp Pro Met Pro Arg Gly Ser Gly Ser Gly Ser Val Val  
1 5 10 15

20

Val Leu Gly Gly Ala Gly Tyr Val Gly Arg His Val Cys Ala Ala Phe  
20 25 30

25

Ala Ala Arg Gly Arg Asp Val Val Val Val Gly Arg Arg Pro Pro Glu  
35 40 45

30

Glu Pro Met Pro Tyr Arg Cys Val Thr Leu Asp Leu Ala Gly Thr Asp  
50 55 60

35

Pro Ala Ala Leu Ala Ala Ala Leu Asp Ala Glu Arg Pro Asp Thr Ile  
65 70 75 80

40

Val Asn Ser Val Gly Ser Ile Trp Gly Arg Thr Asp Glu Gln Met Trp  
85 90 95

Ser Ala Thr Ala Val Pro Thr Leu Arg Leu Leu Glu Ala Leu Ala Leu  
100 105 110

45

Met Ser Ala Arg Pro Arg Leu Val His Leu Gly Ser Val Leu Glu Tyr  
115 120 125

50

Gly Pro Val Thr Pro Gly Gly Ser Val Gly Ala Asp Ala Val Pro Arg  
130 135 140

55

Pro Asp Thr Ala Tyr Gly Arg Ser Lys Leu Ala Ala Ser Glu Ala Val  
145 150 155 160

60

Leu Arg Gly Thr Ser Gly Gly Trp Val Asp Gly Val Val Leu Arg Val  
165 170 175

Ser Asn Val Ser Gly Pro Gly Thr Pro Arg Ile Ser Leu Leu Gly Gln

20/35  
180 185 190

5 Val Ala Glu Arg Leu Leu Ala Ala Ala Gly Thr Gly Ala Glu Ala Val  
195 200 205

10 Val Glu Leu Ser Arg Leu Arg Ala His Arg Asp Tyr Val Asp Val Arg  
210 215 220

Asp Val Ala Asp Ala Val Val Ala Ala Ala Arg Ala Pro Ala Val Pro  
225 230 235 240

15 Val Ala Val Gly Ile Gly Arg Gly Glu Ala Val Ala Val Arg Asp Leu  
245 250 255

20 Val Gly Leu Phe Ile Glu Ala Ser Gly Ile Pro Ala Arg Val Val Glu  
260 265 270

25 Arg Pro Ala Pro Gly Arg Ala Pro Gly His Arg Glu Asp Trp Leu Arg  
275 280 285

30 Val Asp Thr Gly Ala Ala Arg Ala Leu Leu Gly Trp Ala Pro Arg Arg  
290 295 300

Ser Leu Arg Glu Ser Val Arg Asp Cys Trp His Asp Leu Val Arg Ala  
305 310 315 320

35 His Arg Leu Pro Thr Thr Pro Ser Lys His Ser Gly Gly  
325 330

40 <210> 12  
<211> 373  
<212> PRT  
<213> Streptomyces eurythermus

45 <400> 12  
Val Thr Thr Tyr Val Trp Asp Tyr Leu Ala Glu Tyr Gln Asn Glu Arg  
1 5 10 15

50 Ala Asp Leu Leu Asp Ala Val Glu Thr Val Phe Ala Ser Gly Gln Leu  
20 25 30

55 Val Leu Gly Pro Ser Val Asp Gly Phe Glu Lys Glu Phe Ala Asp Tyr  
35 40 45

60 His Gly Leu Arg His Cys Gly Gly Val Asp Asn Gly Thr Asn Ala Val  
50 55 60

21/35

Lys Leu Gly Leu Gln Ala Leu Gly Val Gly Pro Gly Asp Glu Val Val  
65 70 75 80

5 Thr Val Ser Asn Thr Ala Ala Pro Thr Val Val Ala Ile Asp Gly Thr  
85 90 95

10 Gly Ala Thr Pro Val Phe Val Asp Val Arg Ala Glu Asp His Leu Met  
100 105 110

15 Asp Thr Asp Gln Val Ala Asp Val Ile Thr Pro Arg Thr Lys Ala Leu  
115 120 125

20 Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Met Ala Pro Leu Arg  
130 135 140

25 Ala Leu Ala Glu Gln His Gly Leu Val Val Leu Glu Asp Cys Ala Gln  
145 150 155 160

30 Ala His Gly Ala Arg His His Gly Glu Leu Ala Gly Thr Leu Gly Asp  
165 170 175

35 Asp Gly Gly Ala Val Leu Thr Asp Asp Ala Asp Val Asp Arg Ala Leu  
195 200 205

40 Arg Arg Leu Arg Tyr Tyr Gly Met Glu Asp Val Tyr Tyr Val Val Gln  
210 215 220

45 Thr Pro Gly His Asn Ser Arg Leu Asp Glu Val Gln Ala Glu Ile Leu  
225 230 235 240

50 Arg Arg Lys Leu Thr Arg Leu Asp Arg Tyr Ile Glu Gly Arg Arg Ala  
245 250 255

55 Val Ala Arg Arg Tyr Ala Glu Gly Leu Ala Asn Leu Thr Gly Pro Gly  
260 265 270

60 Gly Leu Val Leu Pro Ser Val Thr Glu Gly Asn Asp His Val Tyr Tyr  
275 280 285

Val Tyr Val Val Arg His Pro Arg Arg Asp Asp Ile Ile Glu Ala Leu  
290 295 300

22/35

Lys Ser Tyr Gly Ile Ser Leu Asn Ile Ser Tyr Pro Trp Pro Val His  
305 310 315 320

5 Thr Met Thr Gly Phe Ala His Leu Gly Tyr Ala Lys Gly Ser Leu Pro  
325 330 335

10 Val Thr Glu Arg Leu Ala Asp Glu Ile Phe Ser Leu Pro Met Tyr Pro  
340 345 350

15 Gly Leu Ala Pro Asp Val Gln Asp Lys Val Ile Ala Ala Leu His Glu  
355 360 365

20 Val Leu Ala Thr Leu  
370

25 <210> 13  
<211> 447  
<212> PRT  
<213> Streptomyces eurythermus

30 Val Ser Pro Ala Pro Ala Thr Glu Asp Pro Ala Ala Ala Gly Arg Arg  
1 5 10 15

35 Leu Gln Leu Thr Arg Ala Ala Gln Trp Phe Ala Gly Thr Gln Asp Asp  
20 25 30

40 Pro Tyr Ala Leu Val Leu Arg Ala Glu Ala Thr Asp Pro Ala Pro Tyr  
35 40 45

45 Glu Glu Arg Ile Arg Ala His Gly Pro Leu Phe Arg Ser Asp Leu Leu  
50 55 60

50 Asp Thr Trp Val Thr Ala Ser Arg Ala Val Ala Asp Glu Val Ile Thr  
65 70 75 80

55 Ser Pro Ala Phe Asp Gly Leu Thr Ala Asp Gly Arg Arg Pro Gly Ala  
85 90 95

60 Arg Glu Leu Pro Leu Ser Gly Thr Ala Leu Asp Ala Asp Arg Ala Thr  
100 105 110

65 Cys Ala Arg Phe Gly Ala Leu Thr Ala Trp Gly Gly Pro Leu Leu Pro  
115 120 125

70 Ala Pro His Glu Arg Ala Leu Arg Glu Ser Ala Glu Arg Arg Ala His  
130 135 140

5 Thr Leu Leu Asp Gly Ala Glu Ala Ala Leu Ala Ala Asp Gly Thr Val  
145 150 155 160

10 Asp Leu Val Asp Ala Tyr Ala Arg Arg Leu Pro Ala Leu Val Leu Arg  
165 170 175

15 Glu Gln Leu Gly Val Pro Glu Glu Ala Ala Thr Ala Phe Glu Asp Ala  
180 185 190

20 Leu Ala Gly Cys Arg Arg Thr Leu Asp Gly Ala Leu Cys Pro Gln Leu  
195 200 205

25 Leu Pro Asp Ala Val Ala Gly Val Arg Ala Glu Ala Ala Leu Thr Ala  
210 215 220

30 Val Leu Ala Ser Ala Leu Arg Gly Thr Pro Ala Gly Arg Ala Pro Asp  
225 230 235 240

35 Ala Val Ala Ala Ala Arg Thr Leu Ala Val Ala Ala Ala Glu Pro Ala  
245 250 255

40 Ala Thr Leu Val Gly Asn Ala Val Gln Glu Leu Leu Ala Arg Pro Ala  
260 265 270

45 Gln Trp Ala Glu Leu Val Arg Asp Pro Arg Leu Ala Ala Ala Val  
275 280 285

50 Thr Glu Thr Leu Arg Val Ala Pro Pro Val Arg Leu Glu Arg Arg Val  
290 295 300

55 Ala Arg Glu Asp Thr Asp Ile Ala Gly Gln Arg Leu Pro Ala Gly Gly  
305 310 315 320

60 Ser Val Val Ile Leu Val Ala Ala Val Asn Arg Ala Pro Val Ser Ala  
325 330 335

65 Gly Ser Asp Ala Ser Thr Thr Val Pro His Ala Gly Gly Arg Pro Arg  
340 345 350

70 Thr Ser Ala Pro Ser Val Pro Ser Ala Pro Phe Asp Leu Thr Arg Pro  
355 360 365

75 Val Ala Ala Pro Gly Pro Phe Gly Leu Pro Gly Asp Leu His Phe Arg  
370 375 380

Leu Gly Gly Pro Leu Val Gly Thr Val Ala Glu Ala Ala Leu Gly Ala  
 385 390 395 400

5 Leu Ala Ala Arg Leu Pro Gly Leu Arg Ala Ala Gly Pro Ala Val Arg  
 405 410 415

10 Arg Arg Arg Ser Pro Val Leu His Gly His Ala Arg Leu Pro Val Ala  
 420 425 430

15 Val Ala Arg Thr Ala Arg Asp Leu Pro Ala Thr Ala Pro Arg Asn  
 435 440 445

<210> 14

<211> 424

20 <212> PRT

<213> Streptomyces eurythermus

<400> 14

25 Met Arg Ile Leu Leu Thr Ser Phe Ala His Asn Thr His Tyr Tyr Asn  
 1 5 10 15

30 Leu Val Pro Leu Gly Trp Ala Leu Arg Ala Ala Gly His Asp Val Arg  
 20 25 30

35 Val Ala Ser Gln Pro Ser Leu Thr Gly Thr Ile Thr Gly Ser Gly Leu  
 35 40 45

35 Thr Ala Val Pro Val Gly Asp Asp Thr Ala Ile Val Glu Leu Ile Thr  
 50 55 60

40 Glu Ile Gly Asp Asp Leu Val Leu Tyr Gln Gln Gly Met Asp Phe Val  
 65 70 75 80

45 Asp Thr Arg Asp Glu Pro Leu Ser Trp Glu His Ala Leu Gly Gln Gln  
 85 90 95

50 Thr Ile Met Ser Ala Met Cys Phe Ser Pro Leu Asn Gly Asp Ser Thr  
 100 105 110

55 Ile Asp Asp Met Val Ala Leu Ala Arg Ser Trp Lys Pro Asp Leu Val  
 115 120 125

60 Leu Trp Glu Pro Phe Thr Tyr Ala Gly Pro Val Ala Ala His Ala Cys  
 130 135 140

Gly Ala Ala His Ala Arg Leu Leu Trp Gly Pro Asp Val Val Leu Asn

25/35

145 150 155 160

5 Ala Arg Arg Gln Phe Thr Arg Leu Leu Ala Glu Arg Pro Val Glu Gln  
165 170 175

10 Arg Glu Asp Pro Val Gly Glu Trp Leu Thr Trp Thr Leu Glu Arg His  
180 185 190

15 Gly Leu Ala Ala Asp Ala Asp Thr Ile Glu Glu Leu Phe Ala Gly Gln  
195 200 205

20 Trp Thr Ile Asp Pro Ser Ala Gly Ser Leu Arg Leu Pro Val Asp Gly  
210 215 220

25 Glu Val Val Pro Met Arg Phe Val Pro Tyr Asn Gly Ala Ser Val Val  
225 230 235 240

30 Pro Ala Trp Leu Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Val Thr  
245 250 255

35 Leu Gly Val Ser Thr Arg Glu Thr Tyr Gly Thr Asp Gly Val Pro Phe  
260 265 270

40 His Glu Leu Leu Ala Gly Leu Ala Asp Val Asp Ala Glu Ile Val Ala  
275 280 285

45 Thr Leu Asp Ala Gly Gln Leu Pro Asp Ala Ala Gly Leu Pro Gly Asn  
290 295 300

50 Val Arg Val Val Asp Phe Val Pro Leu Asp Ala Leu Leu Pro Ser Cys  
305 310 315 320

55 Ala Ala Ile Val His His Gly Gly Ala Gly Thr Cys Phe Thr Ala Thr  
325 330 335

60 Val His Gly Val Pro Gln Ile Val Val Ala Ser Leu Trp Asp Ala Pro  
340 345 350

65 Leu Lys Ala His Gln Leu Ala Glu Ala Gly Ile Ala Leu Asp  
355 360 365

70 Pro Gly Glu Leu Gly Val Asp Thr Leu Arg Gly Ala Val Val Arg Val  
370 375 380

75 Leu Glu Ser Arg Glu Met Ala Val Ala Arg Arg Leu Ala Asp Glu  
385 390 395 400

Met Leu Ala Ala Pro Thr Pro Ala Ala Leu Val Pro Arg Leu Glu Arg  
405 410 415

5

Leu Thr Ala Ala His Arg Arg Ala  
420

10

<210> 15  
<211> 240  
<212> PRT  
<213> Streptomyces eurythermus

15

<400> 15

20

Met Asn Leu Glu Tyr Ser Gly Asp Ile Ala Arg Leu Tyr Asp Leu Val  
1 5 10 15

25

His Gln Gly Lys Gly Lys Asp Tyr Arg Ala Glu Ala Glu Glu Leu Ala  
20 25 30

30

Ala Leu Val Thr Gln Arg Arg Pro Gly Ala Arg Ser Leu Leu Asp Val  
35 40 45

35

Ala Cys Gly Thr Gly Met His Leu Arg His Leu Gly Asp Leu Phe Glu  
50 55 60

40

Glu Val Ala Gly Val Glu Met Ser Pro Asp Met Leu Ala Ile Ala Gln  
65 70 75 80

45

Arg Arg Asn Pro Glu Ala Gly Ile His Arg Gly Asp Met Arg Asp Phe  
85 90 95

40

Ala Leu Gly Arg Arg Phe Asp Ala Val Ile Cys Met Phe Ser Ser Ile  
100 105 110

50

Gly His Met Arg Asp Gln Arg Glu Leu Asp Ala Ala Ile Gly Arg Phe  
115 120 125

55

Ala Ala His Leu Pro Ser Gly Gly Val Val Ile Val Asp Pro Trp Trp  
130 135 140

60

Phe Pro Glu Thr Phe Thr Pro Gly Tyr Val Gly Ala Ser Leu Val Glu  
145 150 155 160

Ala Glu Gly Arg Thr Ile Ala Arg Phe Ser His Ser Ala Leu Glu Asp  
165 170 175

27/35

Gly Ala Thr Arg Ile Asp Val Asp Tyr Leu Val Gly Val Pro Gly Glu  
180 185 190

5 Gly Val Arg His Leu Lys Glu Thr His Arg Ile Thr Leu Phe Gly Arg  
195 200 205

10 Ala Gln Tyr Glu Ala Ala Phe Thr Ala Ala Gly Met Ser Val Glu Tyr  
210 215 220

15 Leu Pro His Ala Ala Thr Asp Arg Gly Leu Phe Val Gly Val Gln Ala  
225 230 235 240

20 <210> 16  
<211> 72  
<212> DNA  
<213> Artificial

25 <220>  
<223> primer

30 <400> 16  
ggggaaattca gatctggtct agaggtcagc cggcgtggcg ggcgcgtgagt tcctccagtc 60  
gcgggacgat ct 72

35 <210> 17  
<211> 38  
<212> DNA  
<213> Artificial

40 <220>  
<223> Primer

45 <400> 17  
gggcatatga acgaccgtcc ccgcccgcgcc atgaaggg 38

<210> 18  
<211> 50  
<212> DNA  
<213> Artificial

50 <220>  
<223> primer

<400> 18  
ccctctaga ggtcactgtg cccggctgtc ggcggcggcc ccgcgcatgg 50

55 <210> 19  
<211> 52  
<212> DNA  
<213> Artificial

60 <220>  
<223> primer

5 <400> 19  
ccccctctaga ggtcatgcgc gctccagttc cctgcccggcc ggggaccgct tg 52  
10 <210> 20  
<211> 81  
<212> DNA  
<213> Artificial  
<220>  
<223> primer  
15 <400> 20  
gggtcttagat cgattaatta aggaggacat tcatgcgcgt cctggtgacc ggaggtgcgg 60  
gcttcatcggt ctcgcacttc a 81  
20 <210> 21  
<211> 40  
<212> DNA  
<213> Artificial  
25 <220>  
<223> primer  
<400> 21  
gggcatatgt acgagggcgg gttcgccgag cttaacgacc 40  
30 <210> 22  
<211> 40  
<212> DNA  
35 <213> Artificial  
<220>  
<223> primer  
40 <400> 22  
ggggctctaga ggtcatccgc gcacaccgac gaacaacccg 40  
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